Appendix to credit supply shocks in the Netherlands

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1 Introduction

This appendix contains additional material to accompany Duchi and Elbourne (2016). It contains the impulse response functions for the other shocks under the baseline specification and some more robustness checks for the main results in the paper.

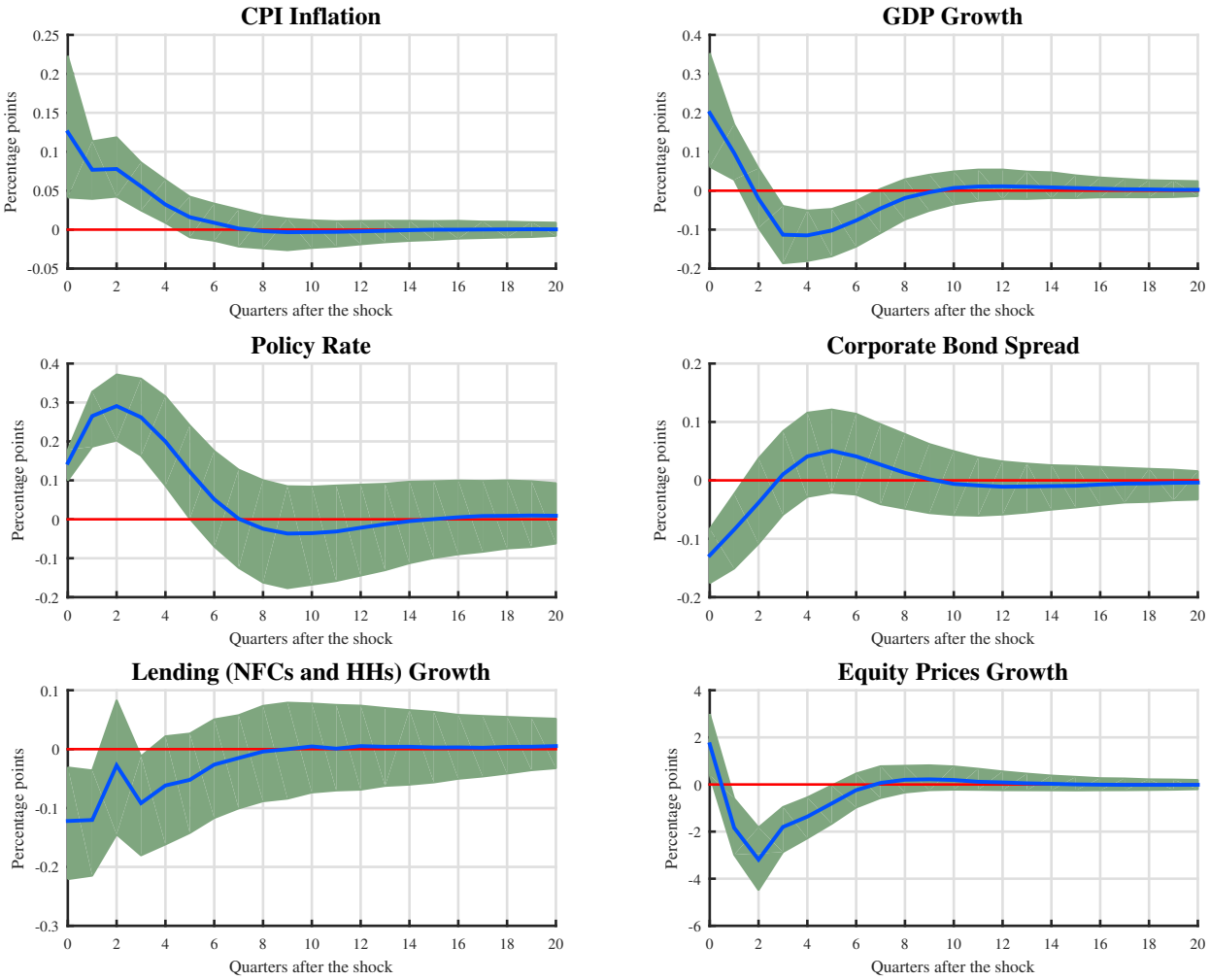
2 The impulse response functions

This section contains the other four sets of impulse responses for the baseline specification. That the other impulse responses are consistent with economic theory helps us have confidence in the credit supply shocks we report in the main text.

Figure 1 contains the responses to a one standard deviation aggregate demand shock. The increase in inflation is fairly persistent taking up to two years to return to baseline. The positive effects on GDP growth are shorter lived and the initial boost to growth is followed by slower growth before returning to baseline after about two years. In total, since the above baseline growth and below baseline growth are roughly equal, our evidence suggests that aggregate demand shocks have no long-run effects on the level of GDP. This is, of course, another commonly used identification strategy for isolating aggregate demand shocks (following Blanchard and Quah, 1989). The policy rate responds more than one-for-one to the extra inflation. Since the Netherlands was part of a monetary union for our sample period, this suggests that aggregate demand shocks are correlated across countries, or at least the euro area countries. Finally, lending growth slows despite the fall in the corporate bond spread in period zero offsetting the rise in the policy rate. This would suggest that immediately following the shock lenders first change their non-price credit conditions before gradually passing the increased interest rates on to borrowers. In general, these responses are very similar to those reported by Bijsterbosch and Falagiarda (2015), except our lending growth response is depressed for slightly longer.

Figure 2 contains the responses to a one standard deviation aggregate supply shock. Once again, these responses are also similar to those reported in Bijsterbosch and Falagiarda (2015). Inflation returns rapidly to baseline. GDP growth is mildly depressed for about a year, although not particularly

Figure 1: Impulse responses to an aggregate demand shock



significantly. It is also worth noting that the GDP growth response never goes more than a very small amount above the baseline, which tells us that our aggregate supply shocks have a permanent effect on the level of GDP. Again this mirrors the common identifying restriction from Blanchard and Quah. The policy rate is depressed for about three years, probably in response to the low growth. The aggregate supply shock depresses lending growth slightly and marginally raises the spread, although the bands for the spread always include the baseline.

Figure 2: Impulse responses to an aggregate supply shock

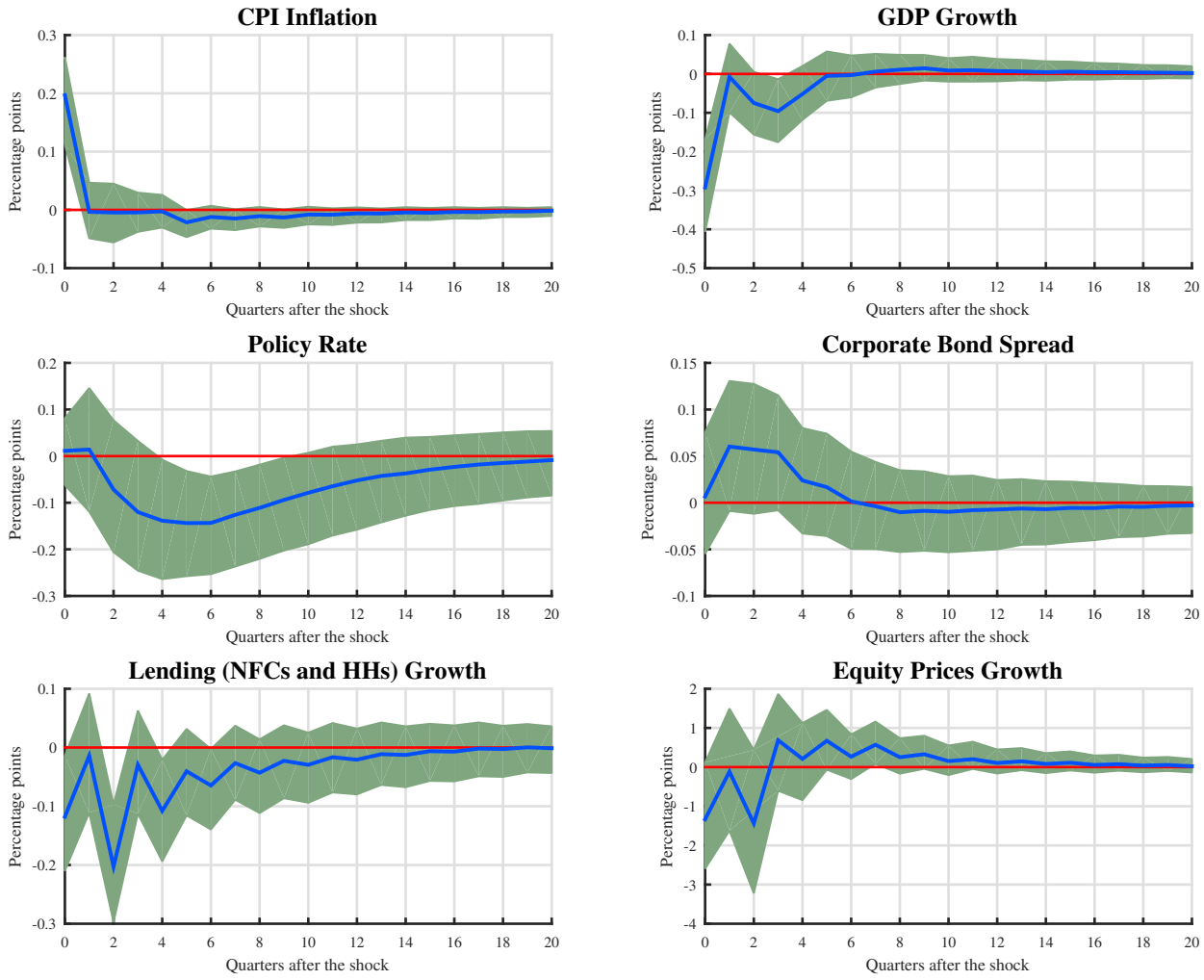
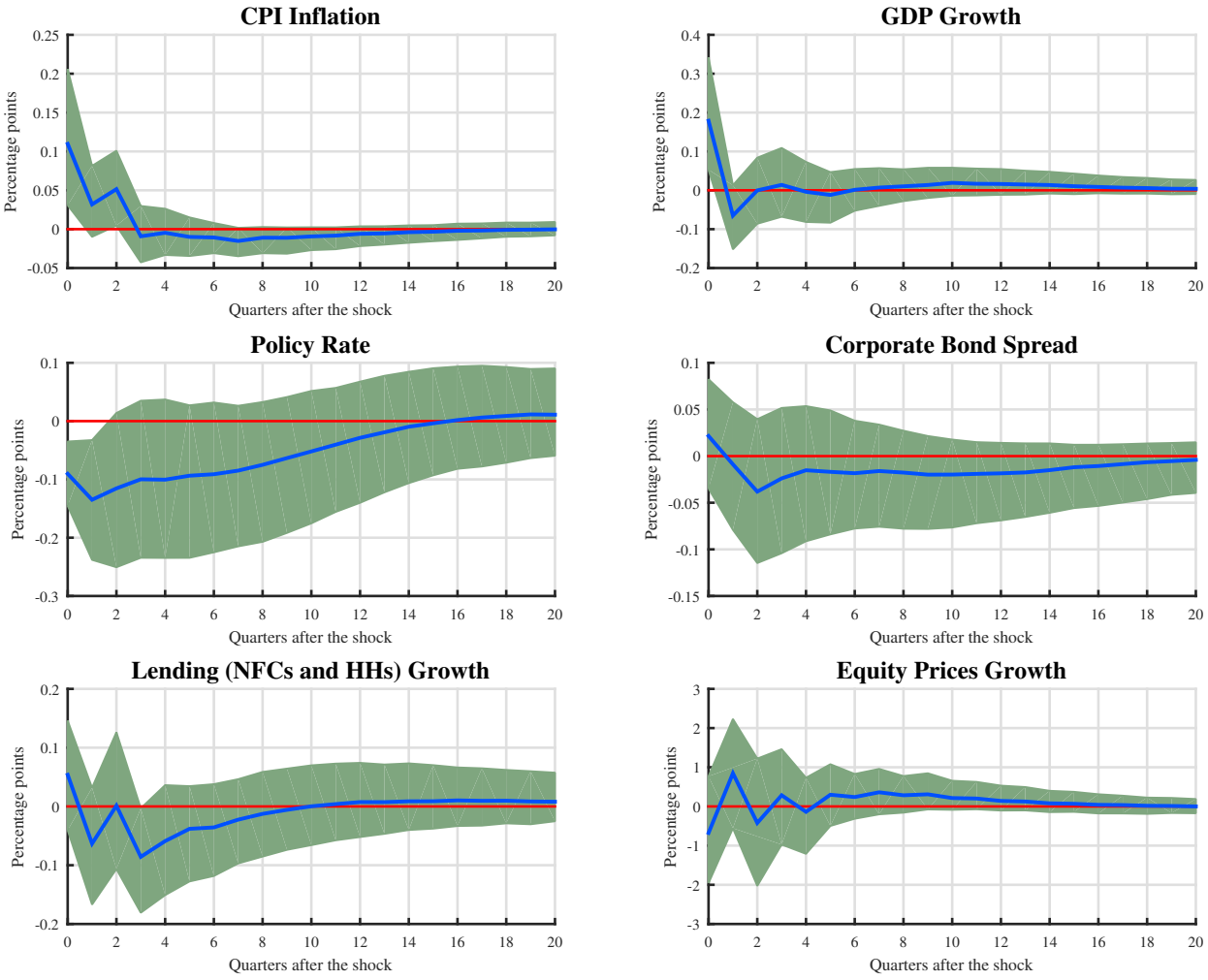


Figure 3 contains the responses to a one standard deviation monetary policy shock. Whilst these responses do not show the typical pattern observed in the literature on monetary policy transmission mechanism with a delay of 18 months before the full effects of monetary policy are felt, these responses are, once again, also very similar to those reported in Bijsterbosch and Falagiarda (2015). For most of the responses the bands include the baseline at almost all horizons.

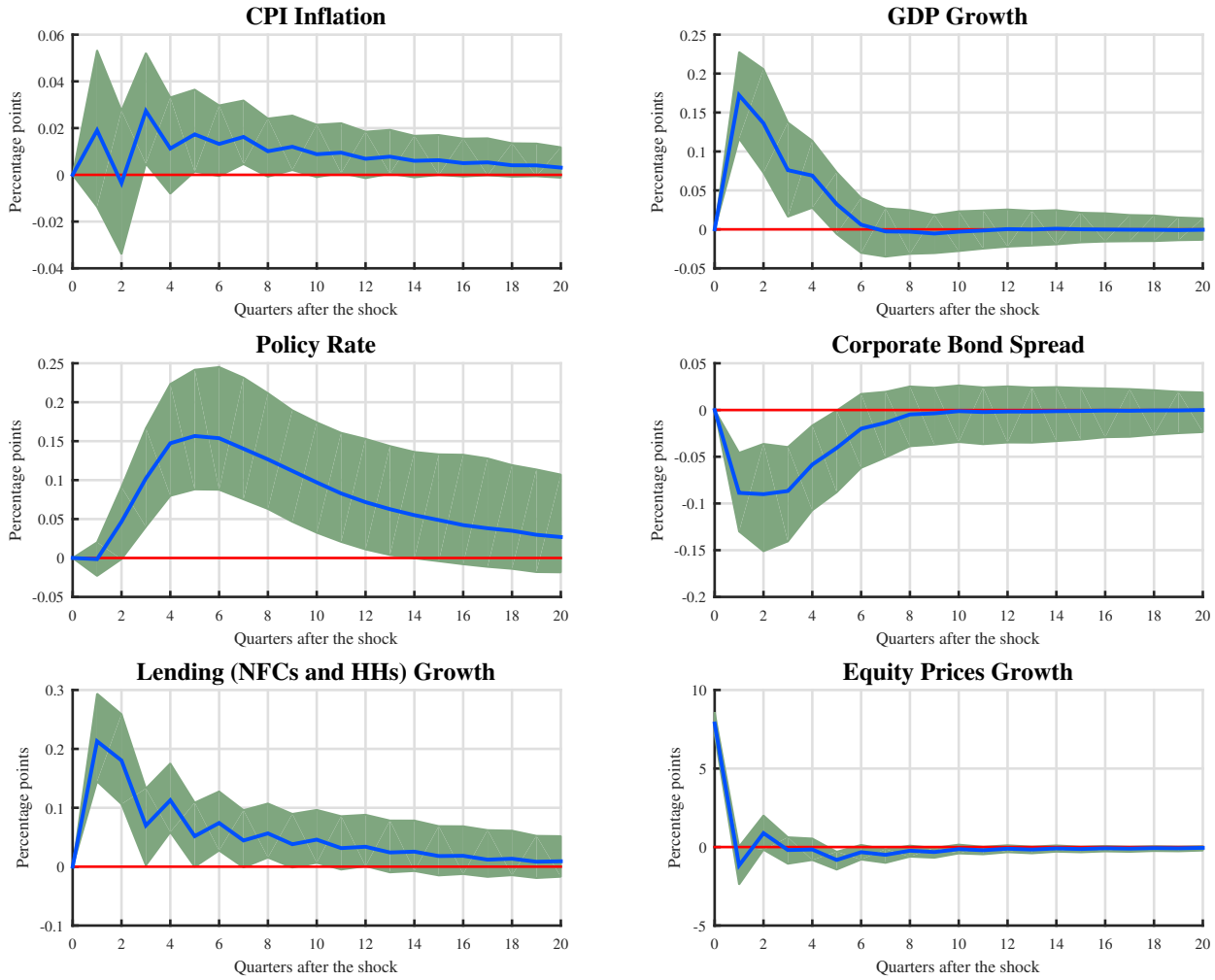
Figure 4 contains the responses to a one standard deviation equity price

Figure 3: Impulse responses to a monetary policy shock



shock, which increases both output growth and inflation leading to a contractionary response of monetary policy. As the efficient markets hypothesis would suggest, equity price growth returns immediately to the baseline following the shock. Additionally, the corporate bond spread falls and lending growth increases, something that is in line with, for example, credit channel theories whereby if firms' net wealth increases banks are more willing to lend to them.

Figure 4: Impulse responses to an equity price shock



3 Robustness

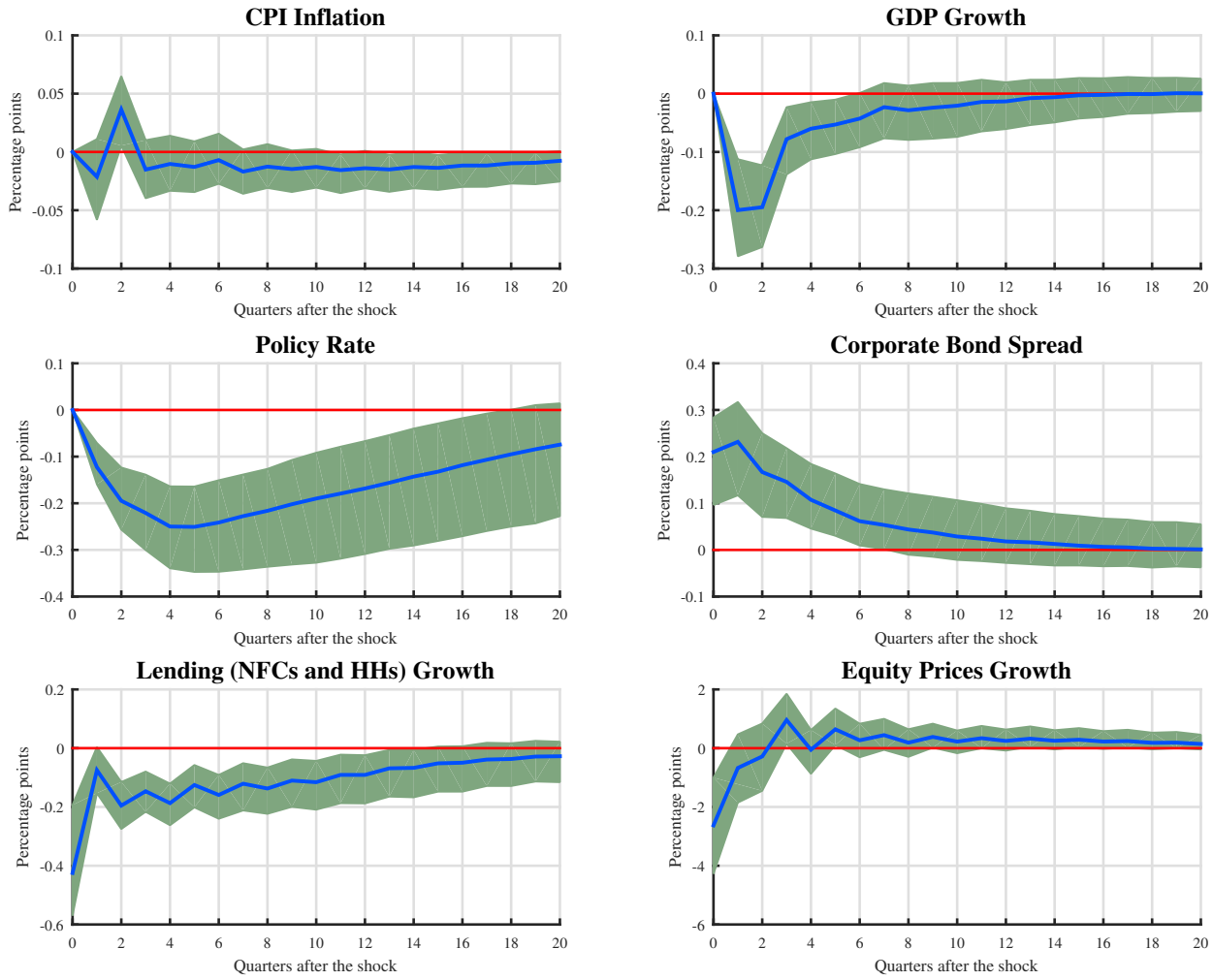
This section adds to the robustness tests reported in the main text.

3.1 Original Barnett and Thomas (2013) identification scheme

In our baseline specification we add an extra restriction to the the original identification scheme of Barnett and Thomas to better differentiate between credit supply and loan demand shocks. Specifically we add the restriction that because positive loan demand shocks lead immediately to higher loan growth, that extra loan growth shows up as increased economic activity in the following period. This section reports the main results when we ignore this extra restriction and use exactly the same identification scheme as Barnett and Thomas. Figure 5 shows the impulse responses to a credit supply shock, which change very little from our baseline specification. The main difference is the initial impact on loan growth, which is larger when we ignore the extra restriction. Furthermore, as shown in Figures 7 and 8 the role of credit supply shocks in the historical decompositions is very similar to the main specification in the paper, albeit with slightly smaller magnitudes. The figures both still show a credit boom before 2008, a persistent effect of credit supply shocks on loan growth after the Great Recession but little role for credit supply shocks in the low GDP growth after 2012.

However, when we stick to the original Barnett and Thomas identification scheme the loan demand impulse response functions (shown in Figure 6) look similar to the credit supply impulse responses except for the response of loan growth in the initial period. This suggests for our sample period for the Netherlands the original identification scheme is insufficient to really distinguish credit supply shocks from loan demand shocks. Furthermore, the time series of identified credit supply shocks under the original identification scheme has too many large shocks for our liking, which is shown in Figure 9. Hence, despite the model with fewer restrictions leading to very similar conclusions regarding credit supply shocks and their role in recent economic developments, our baseline specification has the extra restriction. Even so, as the figures presented here show, our main conclusions are robust to dropping the extra restriction, which should come as little surprise since we showed in the main paper that the main conclusions were robust to only identifying

Figure 5: Impulse responses to an adverse credit supply shock with original Barnett and Thomas (2013) identification scheme



the credit supply shock.

Figure 6: Impulse responses to a positive loan demand shock with original Barnett and Thomas (2013) identification scheme

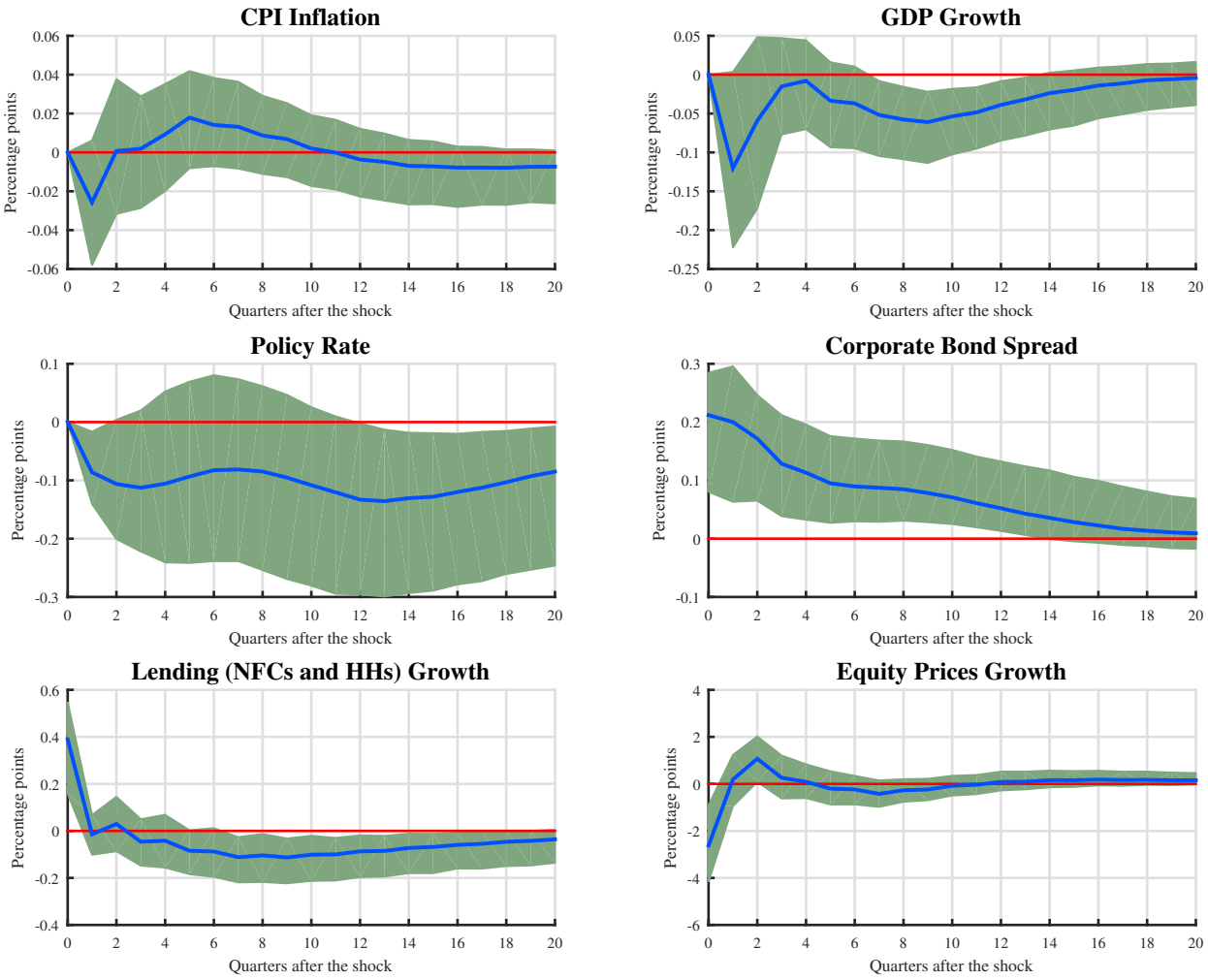


Figure 7: Historical decomposition of loan growth with original Barnett and Thomas (2013) identification scheme

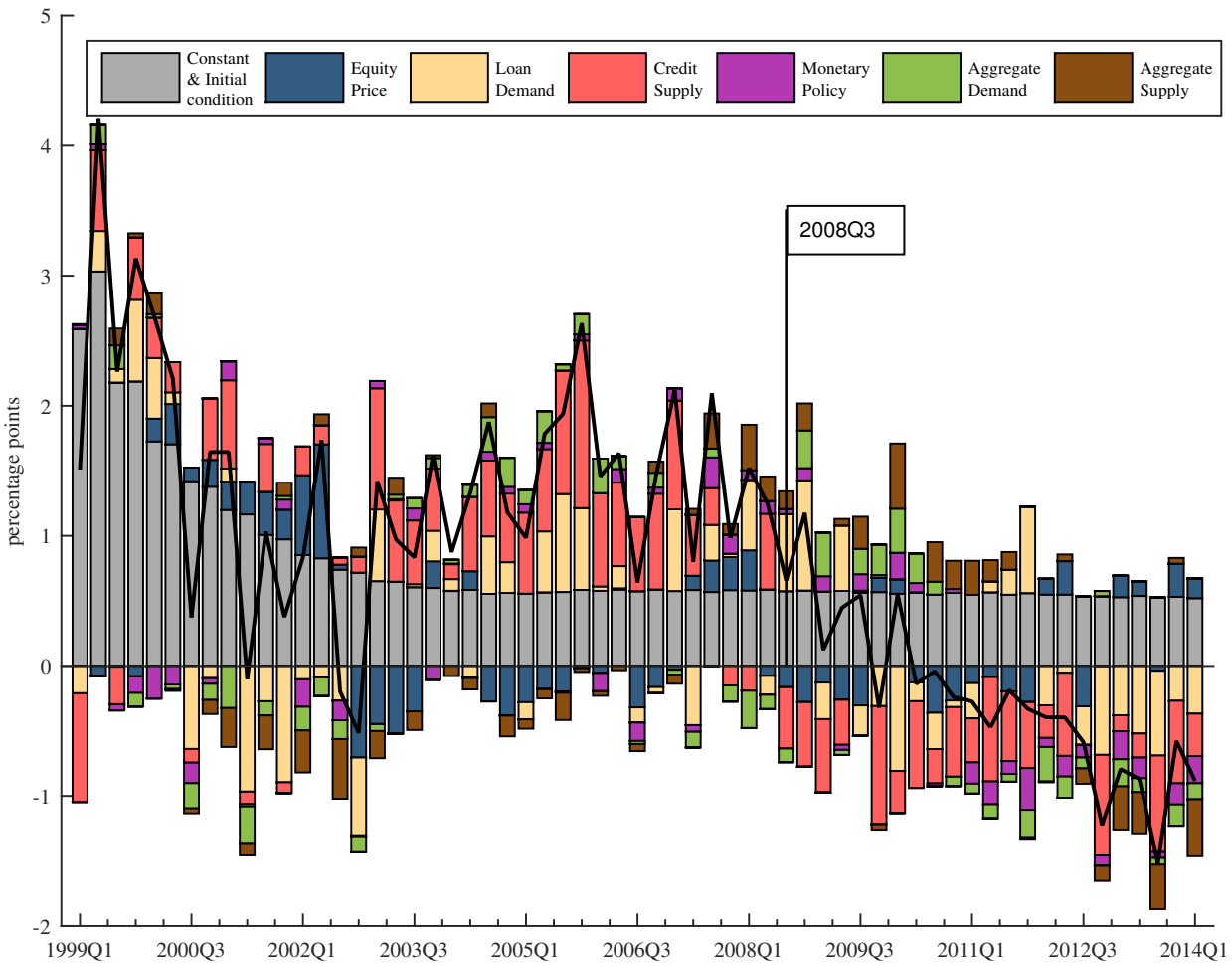


Figure 8: Historical decomposition of GDP growth with original Barnett and Thomas (2013) identification scheme

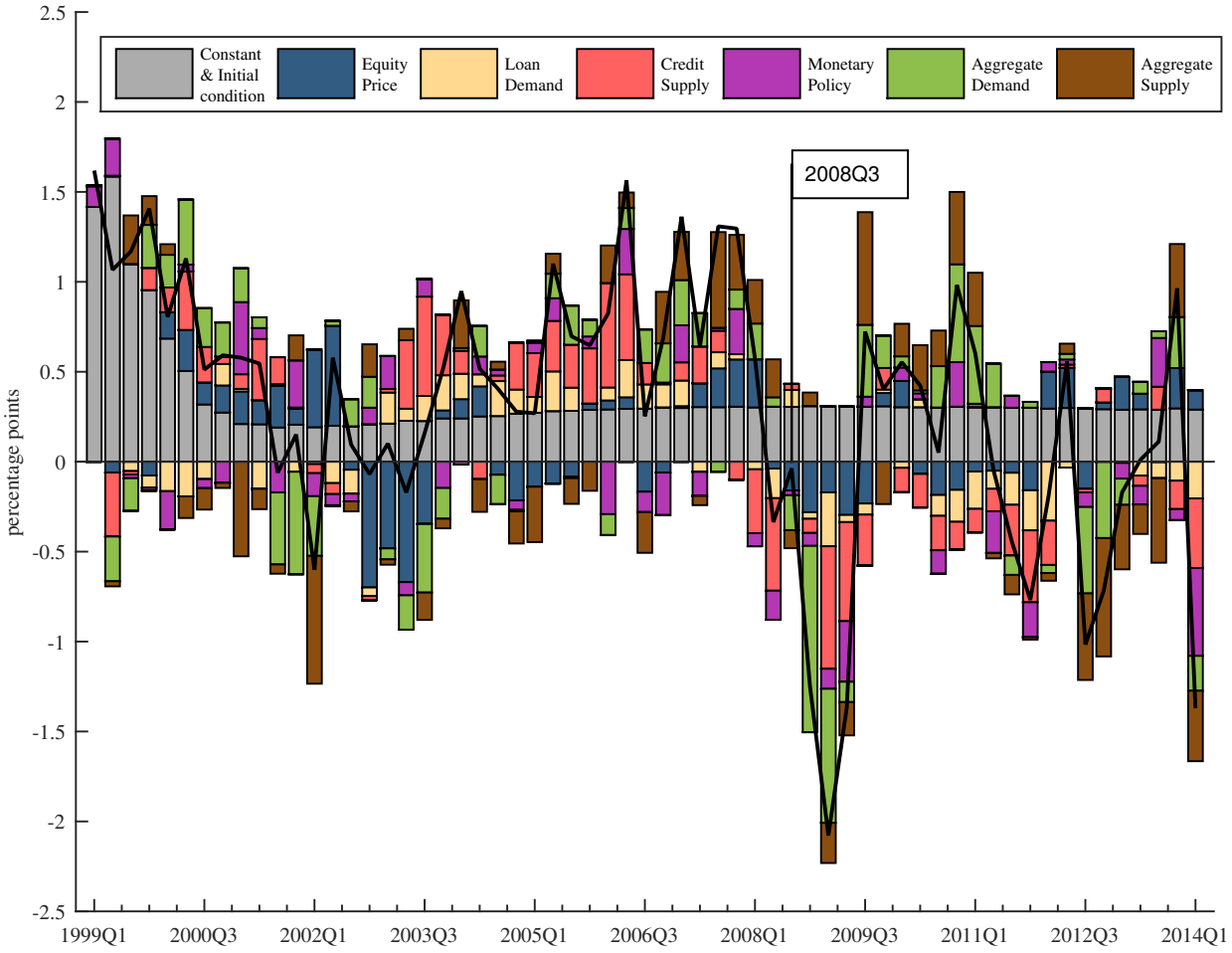
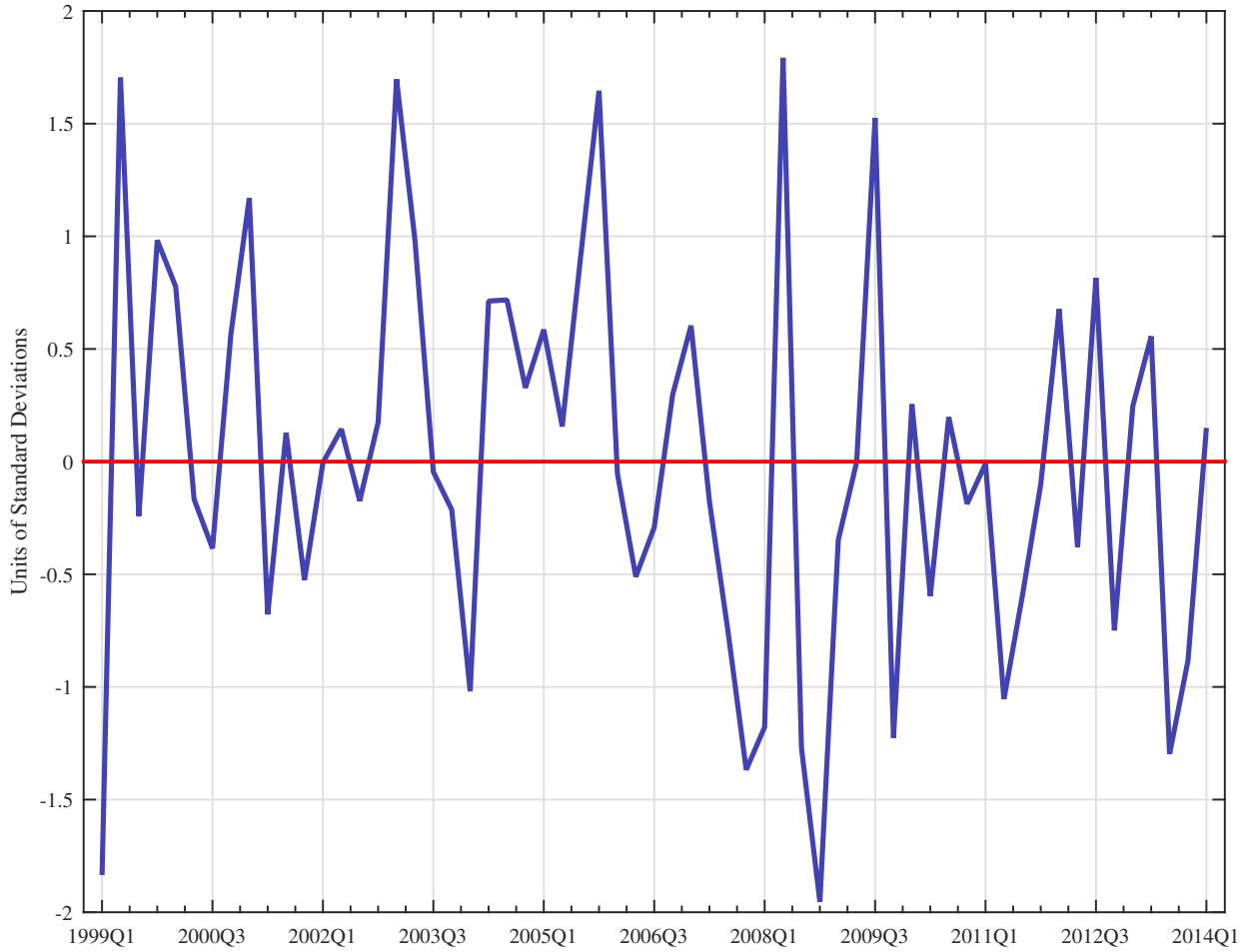


Figure 9: Credit supply shocks with original Barnett and Thomas (2013) identification scheme



3.2 Median target method historical decompositions

With sign restrictions the result is a number of candidate SVAR models, all of which satisfy the zero and sign restrictions. Each and every candidate model has it's own historical decomposition. Since it is not informative to show all of the historical decompositions a summary measure is normally presented. The most commonly used summary measure is the median contribution of each shock in each time period. However, Fry and Pagan (2010) suggest that by taking the median values for each (i) horizon, (ii) variable and (iii) shock, the final estimates of the contribution of the different shocks might come from different models. For example, the contribution of the first shock in period 10 might come from the first model, but the contribution of the second shock might come from the 100th model. This does not ensure that, for a given variable and period, the shocks add up to the actual data point. Hence, Fry and Pagan (2010) proposed the median target (MT) method, which finds the model whose values for the historical decomposition are as close as possible to the median figures. This section presents the historical decompositions calculated using the median target method.[1]

Figures 10 and 11 contain the historical decompositions for lending growth and GDP growth calculated using the median target method. They are very similar to the historical decompositions presented in the main paper, with credit supply shocks having a more persistent effect on loan growth than on GDP growth.

[1] As discussed in Peersman (2011), there is no need to apply that method for the IRFs, because they represent a range of possible outcomes.

Figure 10: Historical decomposition of lending growth under the baseline specification - median target method

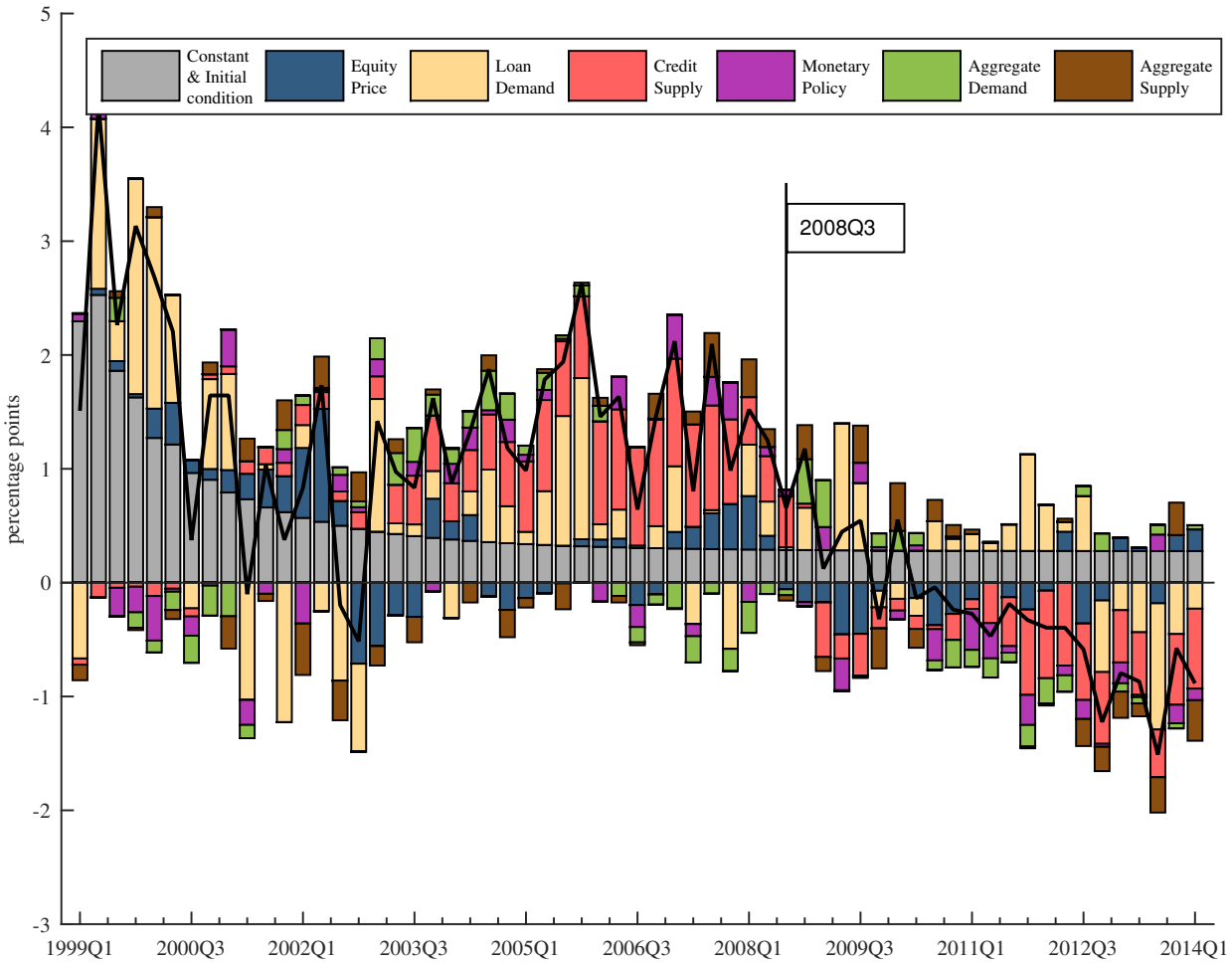
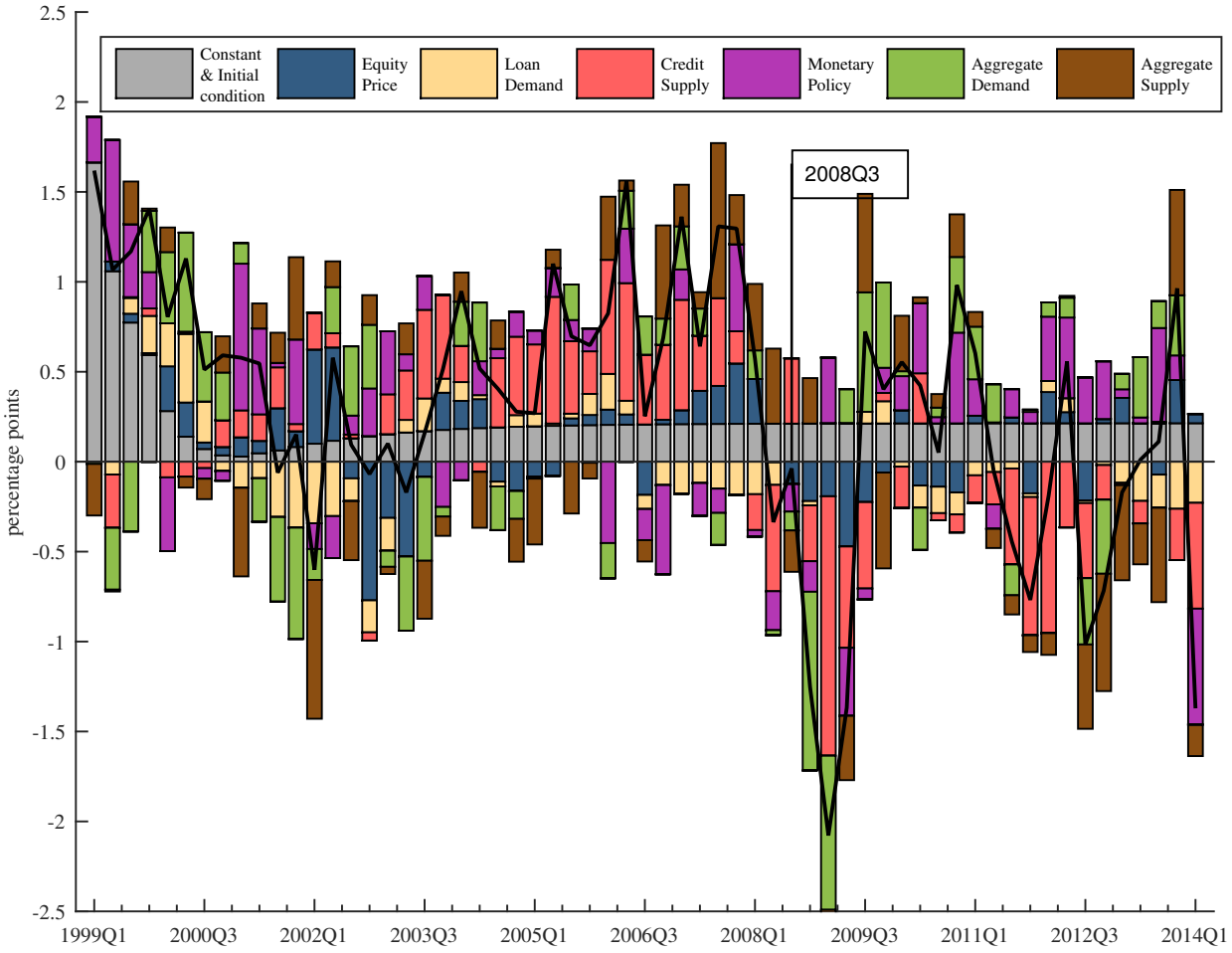


Figure 11: Historical decomposition of GDP growth under the baseline specification - median target method



3.3 Alternative lag lengths

3.3.1 1 lag

In the baseline specification we used 2 lags. However, the Schwarz-Bayesian lag length criteria suggested only 1 lag and we show here the impulse responses to an adverse credit supply shock and the historical decompositions when we use 1 lag. As should be expected with just 1 lag the responses are much smoother, which can be seen in Figure 12. Nonetheless, they tell a very similar story to the baseline specification with 2 lags presented in the main text: little effect on inflation and GDP returning to baseline more quickly than loan growth. For the historical decompositions shown in Figures 13 and 14 the conclusion that credit supply shocks have had a more presistent effect on loan growth than GDP, which shows little effect of credit supply shocks after 2012, still holds. Interestingly, until almost the end of the sample period, the 1 lag results suggest that adverse credit supply shocks were almost the only thing depressing loan growth. Even so, after 2012 output growth showed few effects of credit supply shocks.

Figure 12: Impulse responses to an adverse credit supply shock with 1 lag

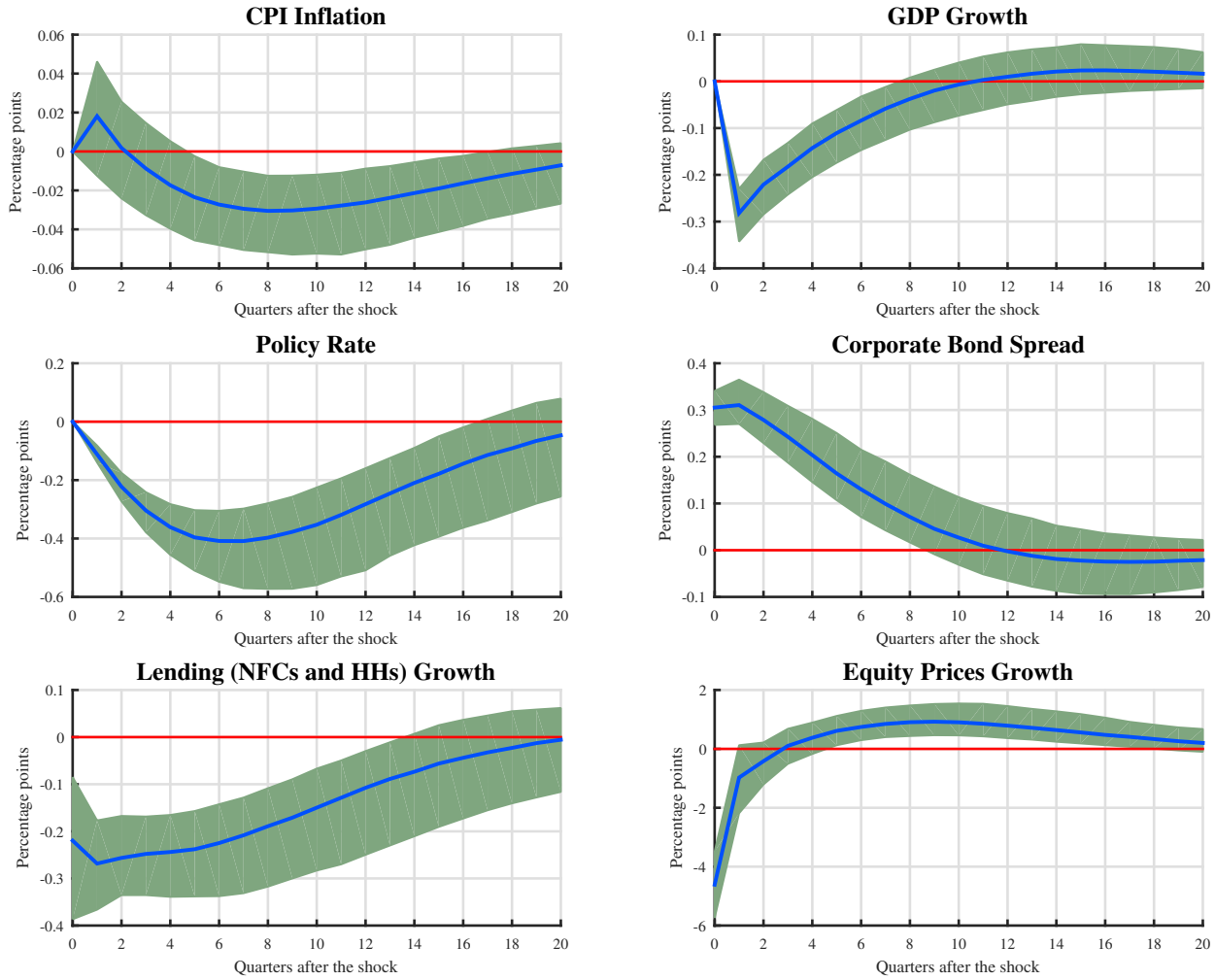


Figure 13: Historical decomposition of loan growth with 1 lag

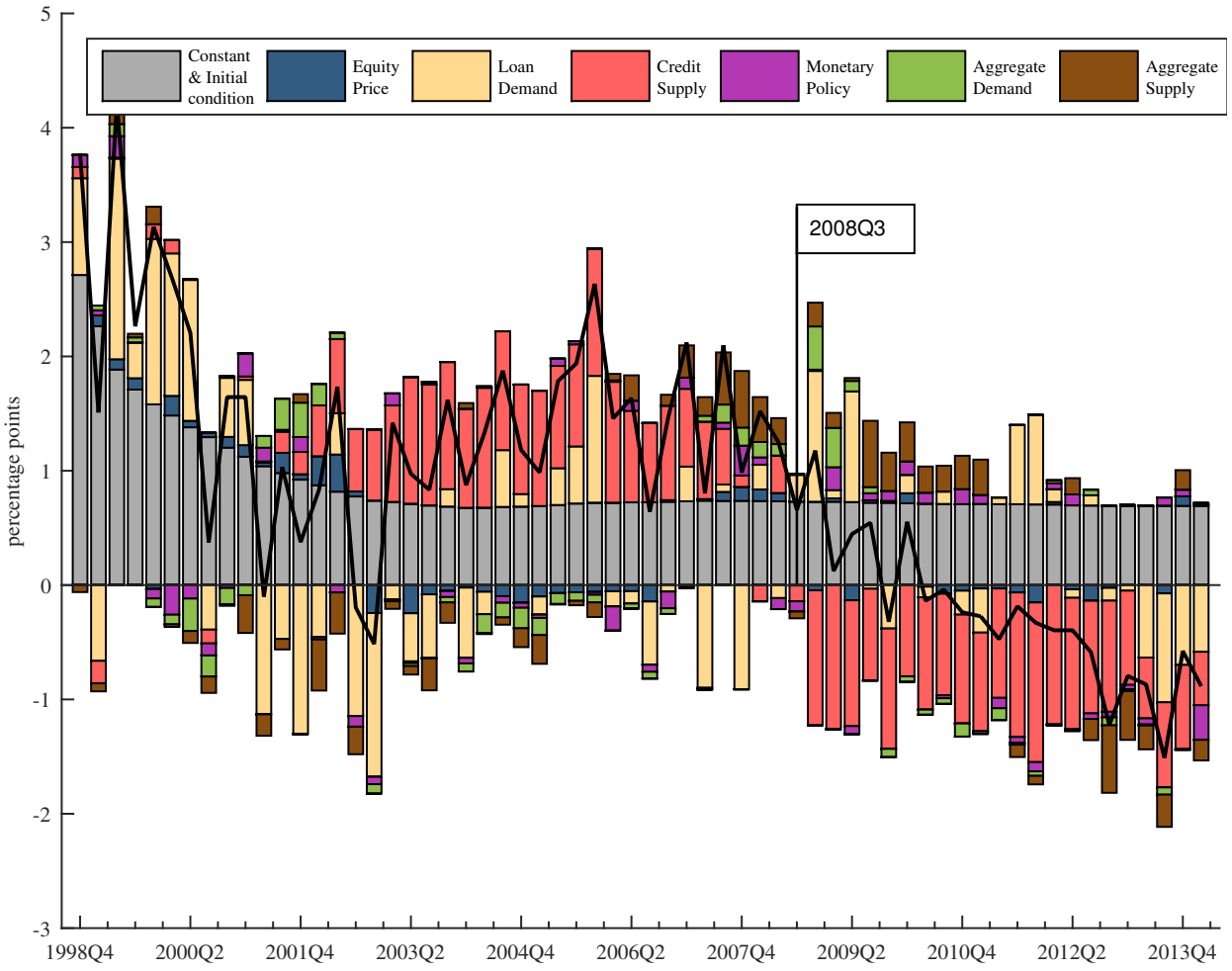
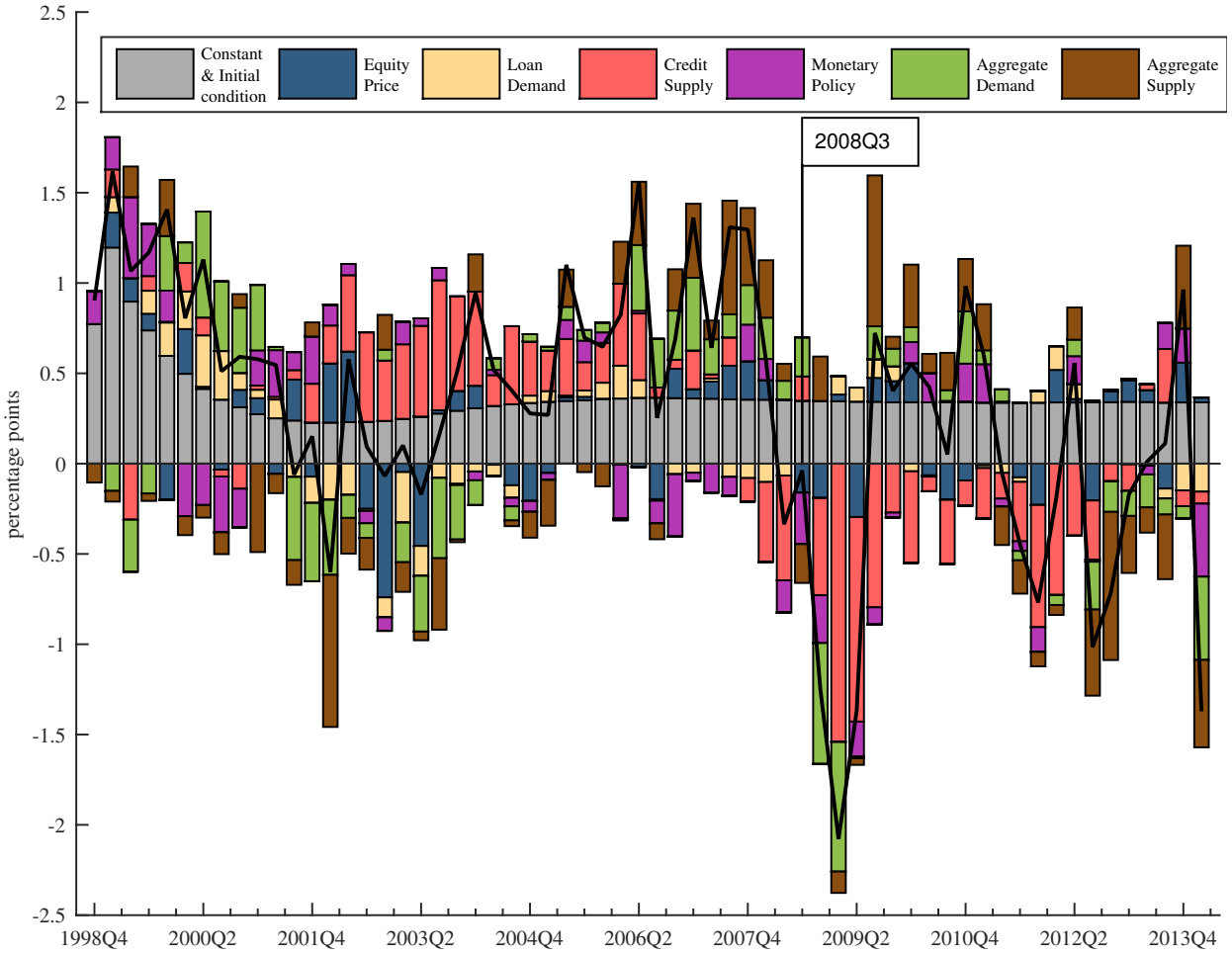


Figure 14: Historical decomposition of GDP growth with 1 lag



3.3.2 3 lags

Estimating with 3 lags also doesn't affect our results significantly, as can be seen in Figures 15 to 17. Adding more lags makes credit supply shocks become marginally less important in the historical decompositions but not enough to affect our main conclusions.

Figure 15: Impulse responses to an adverse credit supply shock with 3 lags

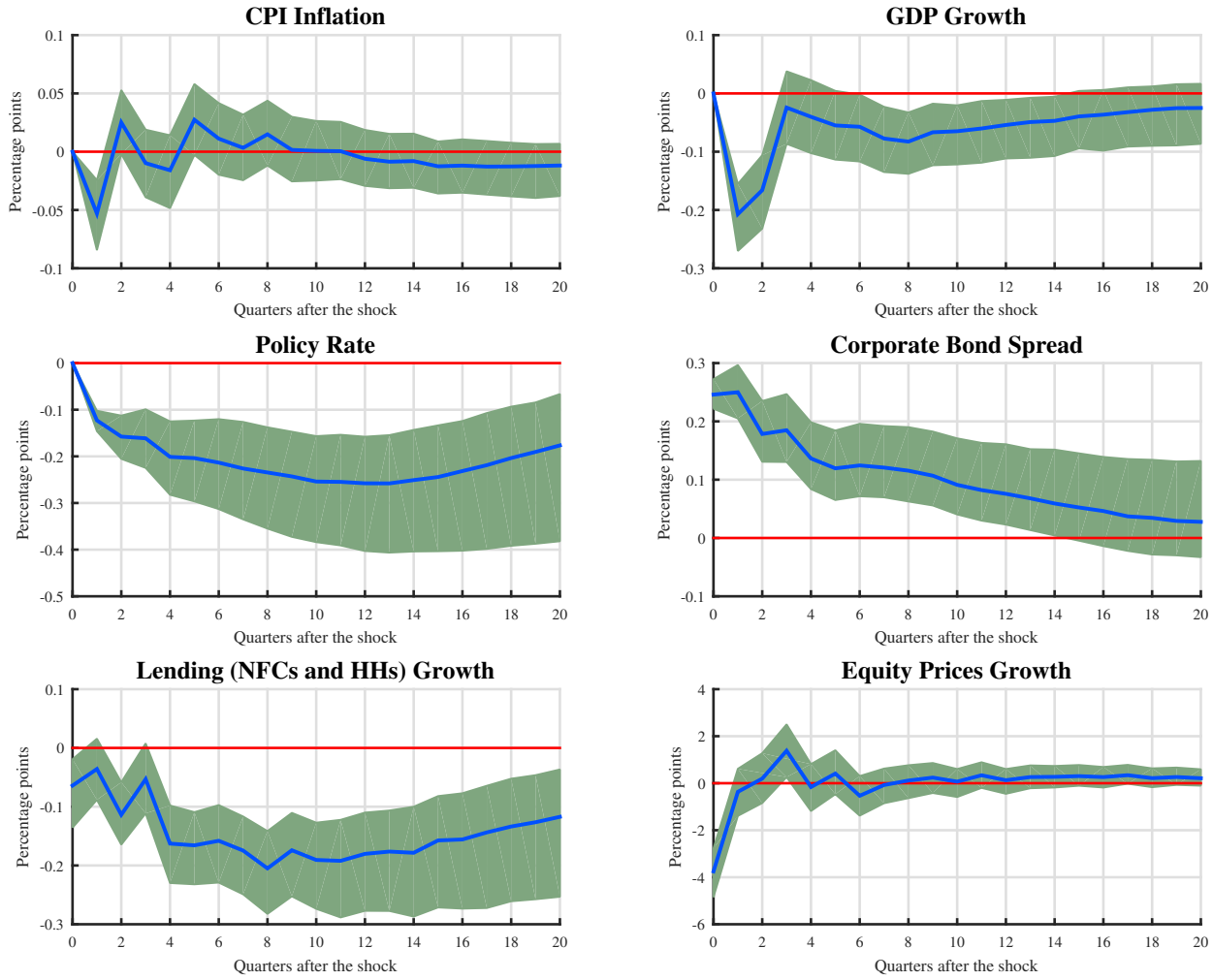
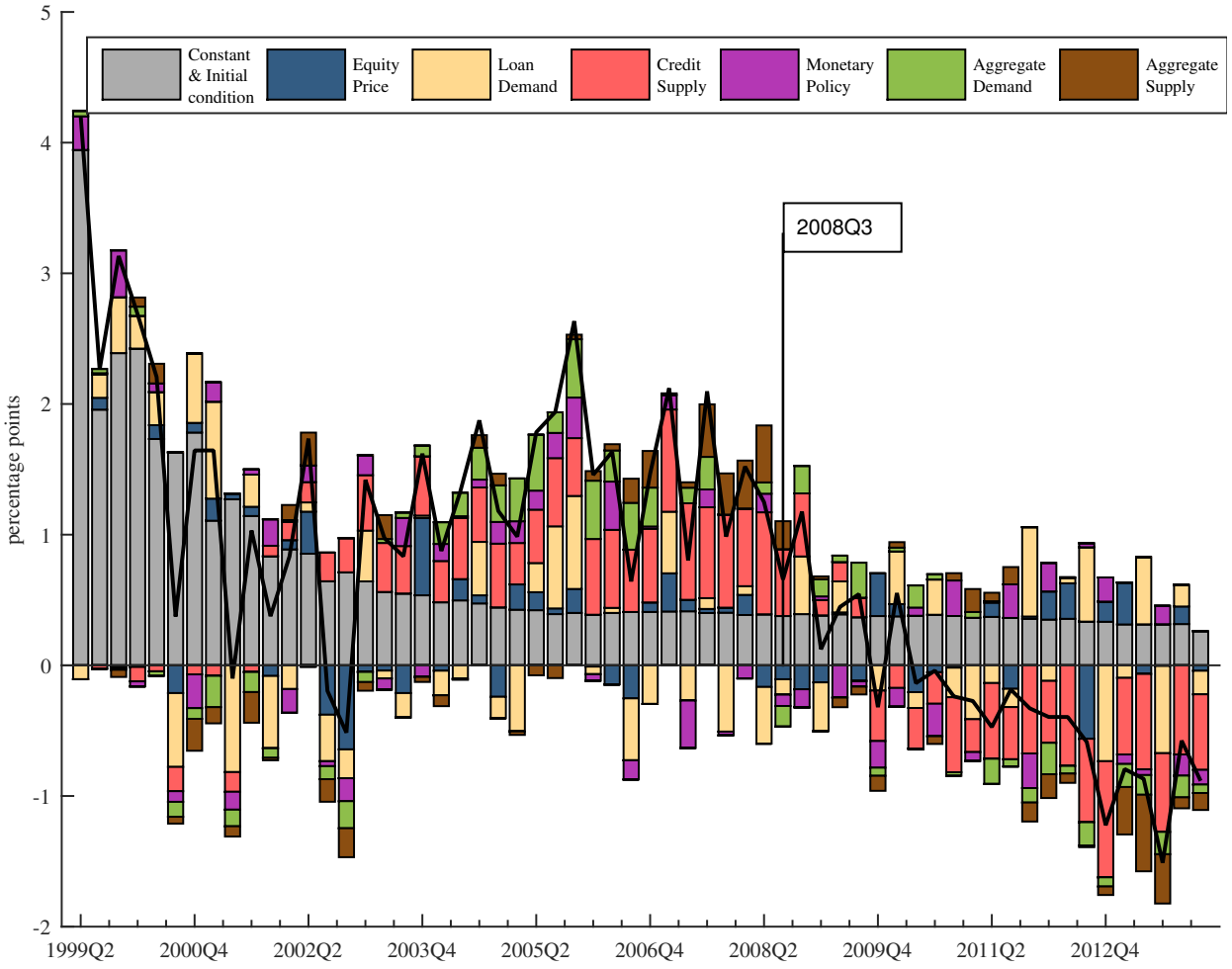


Figure 16: Historical decomposition of loan growth with 3 lags

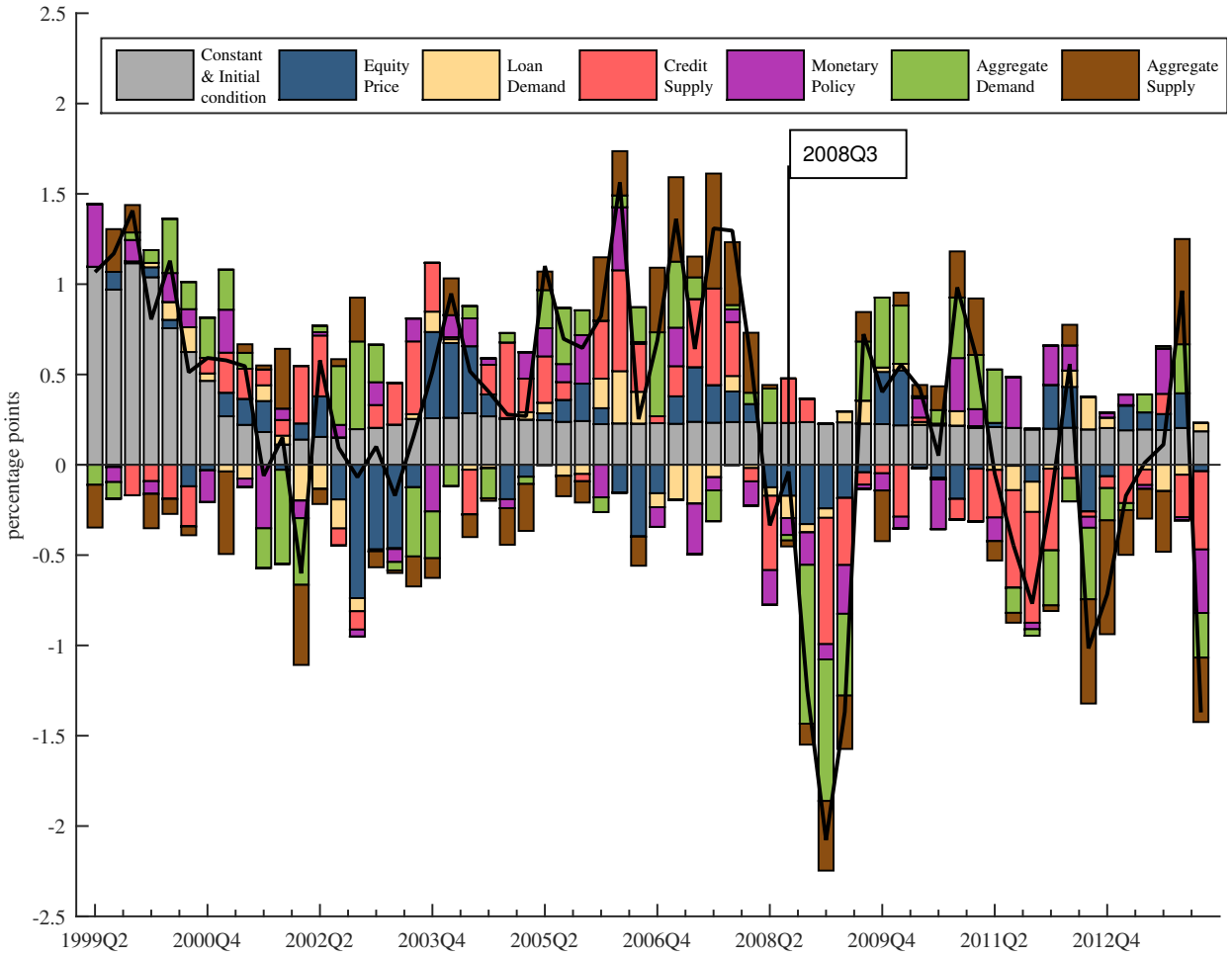


References

[1] Bijsterbosch, M. and Falagiarda, M. (2015). 'The macroeconomic impact of financial fragmentation in the euro area: Which role for credit supply?'. Journal of International Money and Finance, 2015, vol. 54, issue C, pages 93-115.

[2] Blanchard, O. and Quah, D. (1989). "The dynamic effects of aggregate demand and supply disturbances," American Economic Review, American Economic Association, vol. 79(4), pages 655-73, September.

Figure 17: Historical decomposition of GDP growth with 3 lags



[3] Duchi, F. and Elbourne, A. (2016). 'Credit supply shocks in the Netherlands'. CPB Discussion Paper 320, CPB Netherlands Bureau for Economic Policy Analysis.